Toxic Shock Syndrome
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Toxic Shock Syndrome

Overview[1,2]

For a more complete description of toxic shock syndrome, refer to the following texts:

- Control of Communicable Diseases Manual (CCDM).
- Red Book, Report of the Committee on Infectious Diseases.

Case Definition[3]

Clinical case definition
An illness with the following clinical manifestations:

- Fever: temperature ≥102.0 F (≥38.9 C)
- Rash: diffuse macular erythroderma
- Desquamation: 1–2 weeks after onset of illness, particularly on the palms and soles
- Hypotension: systolic blood pressure ≤90 mm Hg for adults or less than fifth percentile by age for children aged <16 years; orthostatic drop in diastolic blood pressure ≥15 mm Hg from lying to sitting, orthostatic syncope, or orthostatic dizziness
- Multisystem involvement (three or more of the following):
  - Gastrointestinal: vomiting or diarrhea at onset of illness
  - Muscular: severe myalgia or creatine phosphokinase level at least twice the upper limit of normal
  - Mucous membrane: vaginal, oropharyngeal, or conjunctival hyperemia
  - Renal: blood urea nitrogen or creatinine at least twice the upper limit of normal for laboratory or urinary sediment with pyuria (≥5 leukocytes per high-power field) in the absence of urinary tract infection
  - Hepatic: total bilirubin, alanine aminotransferase enzyme, or asparate aminotransferase enzyme levels at least twice the upper limit of normal for laboratory
  - Hematologic: platelets <100,000/mm^3
  - Central nervous system: disorientation or alterations in consciousness without focal neurologic signs when fever and hypotension are absent

Laboratory criteria for diagnosis

Negative results on the following tests, if obtained:

- Blood, throat, or cerebrospinal fluid cultures (blood culture may be positive for *Staphylococcus aureus*)
- Rise in titer to Rocky Mountain spotted fever, leptospirosis, or measles

Case classification

Probable: a case in which four of the five clinical findings described above are present
Confirmed: a case in which all five of the clinical findings described above are present, including desquamation, unless the patient dies before desquamation occurs

Note: Toxic shock syndrome can occur secondary to *Streptococcus pyogenes*, and has a different clinical case definition. See Streptococcal Toxic-Shock Syndrome.

Information Needed for Investigation:

Verify the diagnosis. What laboratory tests were conducted and what were the results?
Establish the extent of illness. *Determine if household* or other close contacts are, or have been ill, by contacting the health care provider, patient or family member.
Contact the district communicable disease coordinator, if an outbreak is suspected, or if cases are in high-risk settings or jobs such as food handlers, day care, or health care.
Contact Bureau of Child Care Safety and Licensure, if cases are associated with day care.

Case/Contact Follow-Up And Control Measures

Control Measures

As this syndrome is not communicable, there are no control measures *per se*. Early cases of TSS were almost entirely found in women during menstruation and most were related to use of super absorbent tampons. Currently, only about 55% of cases are reported to be associated with menses. Many others are related to intervaginal birth control devices, such as diaphragms or vaginal sponges, or infection following childbirth or abortion. Using tampons with the minimum absorbency for controlling flow, coupled with frequent changes and alternating with pads during the period can reduce the chance of menstrual associated TSS. Women with a previous history of menstrual TSS should refrain from the use of tampons entirely. Instructions on the use of intervaginal birth control devices, especially with respect to the length of time such devices are left in place, should be followed closely. [1]

Laboratory Procedures

Laboratory procedures for TSS are geared toward ruling out other potential diagnoses, such as meningococcemia, leptospirosis, measles, Rocky Mountain spotted fever, or other bacteremia.[1,4] As noted in the laboratory criteria section above, lab cultures or serological screening should be negative except that a positive culture of *Staphylococcus aureus*, especially from a vaginal site, is acceptable.

Reporting Requirements

Toxic Shock Syndrome is a Category *I* disease and must be reported to the Department of Health within 24 hours of suspected diagnosis.

1. For confirmed and probable cases, complete a "Disease Case Report" (CD-1) and a "Toxic Shock Syndrome Case Report" (CDC 52.3), with special attention to tampon usage is required.
2. Entry of the completed CD-1 into the MOHSIS database negates the need for the paper CD-1 to be forwarded to the District Health Office.
3. Send the completed secondary investigation form(s) to the District Health Office.
4. All outbreaks or "suspected" outbreaks should be reported as soon as possible (by phone, fax, or e-mail) to the District Communicable Disease Coordinator. This can be accomplished by completing the Missouri Outbreak Surveillance Report (CD-51).
5. Within 90 days from the conclusion of an outbreak, submit the final outbreak report to the District Communicable Disease Coordinator.

References

1. Chin, James, ed. "Staphylococcal Diseases, Toxic Shock Syndrome." Control of Communicable Diseases Manual, 17th ed. Washington, D.C.: American Public Health Association, 2000: 469-470.
2. American Academy of Pediatrics. "Toxic Shock Syndrome." In: Pickering, LK, ed. 2000 Red Book: Report of the Committee on Infectious Diseases. 25th ed. Elk Grove Village, IL. 2000: 576 - 581.
3. Case Definitions for Infectious Conditions Under Public Health Surveillance. Recommendations and Reports: MMWR, May 2, 1997; Vol.46;No. RR-10: 39-40
4. Evans, AS and Brachman, PS, ed. Bacterial Infections of Humans - Epidemiology and Control, 3rd ed. New York: Plenum, 1998: 657-672.

OTHER SOURCES OF INFORMATION

Mandell, GL, Bennett, JE, and Dolin, R, ed. *Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases*, 4th ed. New York: Churchill Livingstone, 1995:

McCormick JK, Yarwood JM, Schlievert PM "Toxic shock syndrome and bacterial superantigens: an update". Annu Rev Microbiol 2001;55:77-104

Odom SR, Stallard JD, Pacheco HO, Ho H. "Postoperative staphylococcal toxic shock syndrome due to preexisting staphylococcal infection: case report and review of the literature". Am Surg 2001. Aug;67(8):745-7.

Web Sites

1. Homepage of The Toxic Shock Syndrome Information Service (UK) http://www.toxicshock.com/ (26 June 2002)
2. CDC. Division of Public Health Surveillance and Informatics. http://www.cdc.gov/ncidod/dbmd/diseaseinfo/toxicshock_t.htm (26 June 2002)

TOXIC SHOCK SYNDROME (TSS)

Fact Sheet

What is toxic shock syndrome?

Toxic shock syndrome is a severe illness characterized by a sudden onset of high fever, vomiting, profuse watery diarrhea, and muscle aches. It is typically followed by hypotension (low blood pressure) and, in severe cases, shock.

There are two types of toxic shock syndrome. This fact sheet describes that type caused by *Staphylococcus aureus*. The other kind of toxic shock syndrome is caused by group A streptococcal bacteria and it is described on the Streptococcal Toxic Shock Syndrome fact sheet.

Who gets toxic shock syndrome?

Toxic shock syndrome occurs in some people who have *Staphylococcus aureus* infections. While almost anyone could develop toxic shock syndrome, women who use vaginal tampons, contraceptive diaphragms or vaginal contraceptive sponges, and women who have recently given birth or had an abortion are at the greatest risk. Men and women who have an infection with S. aureus are also known to be at risk for developing toxic shock syndrome.

How is toxic shock syndrome spread?

Toxic shock syndrome is not spread from one person to another.

What are the symptoms of toxic shock syndrome?

People who have toxic shock syndrome will have:

A sudden onset of high fever. A "sunburn-like" rash (diffuse macular erythroderma), peeling of the skin on the palms and soles of the feet 1 to 2 weeks after the onset of illness, hypotension (low blood pressure), involvement of three or more of the following organ systems: gastrointestinal, muscular, mucous membranes, renal (related to the kidneys), hepatic (related to the liver), hematologic (related to the blood), and central nervous system

For an illness to be called toxic shock syndrome, there must also be no other bacteria or virus identified as a more likely cause of the illness. Toxic shock syndrome is probable when at least five of the six major criteria are fulfilled. Patients who die before peeling of the skin would have occurred but whose illness is otherwise compatible are considered definite cases.

How soon after exposure do symptoms appear?

For most people with toxic shock syndrome, the time when they are first exposed to *Staphylococcus aureus* is unknown. However, for people with toxic shock syndrome that is

associated with an infected wound or surgical contamination, the time from exposure to their onset of symptoms is two days.

How is toxic shock syndrome diagnosed?

A physician is needed to properly diagnose toxic shock syndrome.

What is the treatment for toxic shock syndrome?

People with toxic shock syndrome are treated for any symptoms or complications they may have. Any cause of infection (i.e., wound or foreign body) should be removed as quickly as possible. Doctors will also prescribe antibiotics to treat the infection.

How can toxic shock syndrome be prevented?

Women who are using vaginal tampons, contraceptive diaphragms or vaginal contraceptive sponges need to read and follow the manufacturer's instructions as far as how long to leave the products in place. Women who are menstruating and develop a high fever with vomiting and diarrhea need to discontinue any vaginal tampon use immediately and contact their health care provider.

Where can I get more information?

Your health care provider, or your local health department listed in your telephone directory.

Missouri Department of Health and Senior Services
Section of Communicable Disease Control and Veterinary Public Health
Phone: (800) 392-0272 (573) 751-6113

Patient's Name _____ Telephone No. _____ TOXIC - SHOCK SYNDR

Address _____ *(Detach top portion here*

U.S. DEPARTMENT OF HEALTH & HUMAN SERVICES
Public Health Service
Centers for Disease Control and Prevention (CDC)
Atlanta, Georgia 30333

TOXIC - SHOCK SYNDROME CASE REPORT

CDC
CENTERS FOR DISEASE CONTROL AND PREVENTION

FORM APPROVED
OMB NO. 0920-0009

The First Three Letters of Patient's Last Name (1-3) ☐☐☐ | **CDC No.** (4-8) ☐☐☐☐☐ | **State No.** (9-10) ☐☐ | **State Case No.** (11-15) ☐☐☐☐☐

Age (16-17) ☐☐

Date of Birth Mo. (18-19) ☐☐ Day (20-21) ☐☐ Yr. (22-23) ☐☐

Sex (24) Male ☐ 1 Female ☐ 2

Outcome (25) Lived ☐ 1 Died ☐ 2

Race/Ethnicity (26)
☐ 1 White (not Hispanic)
☐ 2 Black (not Hispanic)
☐ 3 Hispanic
☐ 4 Asian/Pacific Islander
☐ 5 American Indian/Alaskan Native
☐ 9 Not Specified

Date of Onset of Symptoms Mo. (27-28) ☐☐ Day (29-30) ☐☐ Yr. (31-32) ☐☐

Date of Onset of Coincident Menstrual Period (If applicable) Mo. (33-34) ☐☐ Day (35-36) ☐☐ Yr. (37-38) ☐☐

Admitted to Hospital (39) Yes ☐ 1 No ☐ 2 Unk ☐ 9

Date of Hospital Admission Mo. (40-41) ☐☐ Day (42-43) ☐☐ Year (44-45) ☐☐

CASE CLASSIFICATION (46)
Menstruation-associated ☐ 1 Other ☐ 4
Wound-associated ☐ 2 (specify)
Postpartum-associated ☐ 3 _____
No. days postpartum ☐☐ (47-48)

CLINICAL FINDINGS Major Criteria

Fever (highest-if not recorded, leave blank) ☐☐☐.☐ F (49-52)

Hypotension (lowest) Systolic ☐☐☐ (53-55) Diastolic ☐☐ (56-57)

Syncope Yes ☐1 No ☐2 (58)

Orthostatic dizziness Yes ☐1 No ☐2 (59)

Rash (60) Yes ☐1 No ☐2 Unk. ☐9 (61) If yes, Generalized ☐1 Focal ☐2 **Describe:** _____

Desquamation (62) Yes ☐1 No ☐2 Unk. ☐9 If yes, describe: _____

SIGNS AND SYMPTOMS (First 4 Days of Illness)

	YES 1	NO 2	UNK 9
(63) Vomiting	☐	☐	☐
(64) Diarrhea	☐	☐	☐
(65) Abdominal pain	☐	☐	☐
(66) Myalgia	☐	☐	☐
(67) Sore throat	☐	☐	☐
(68) Conjunctival hyperemia	☐	☐	☐
(69) Oropharyngeal hyperemia	☐	☐	☐
(70) Injected tongue	☐	☐	☐
(71) Vaginal hyperemia	☐	☐	☐
(72) Vaginal discharge	☐	☐	☐
(73) Vaginal ulceration	☐	☐	☐
(74) Disorientation	☐	☐	☐
(75) Seizures	☐	☐	☐
(76) Cardiac Arrhythmia	☐	☐	☐

If Yes, describe _____ _____

LABORATORY DATA (Most Abnormal Values in First 4 Days of Illness)

		Not Obtained
WBC Count (77-79) ☐☐.☐ 000/mm³		(80) ☐
(81-82) Neutrophils	☐☐ %	(83) ☐
(84-85) Bands	☐☐ %	(86) ☐
(87-88) Metamyelocytes	☐☐ %	(89) ☐
(90-91) Myelocytes	☐☐ %	(92) ☐
(93-95) Platelets	☐☐☐ 000/mm³	(96) ☐
(97-99) Highest platelet value after 7 days of illness	☐☐☐ 000/mm³	
(100-102) SGOT	☐☐☐ IU/L	(103) ☐
(104-106) SGPT	☐☐☐ IU/L	(107) ☐
(108-110) Alkaline phosphatase	☐☐☐ IU/L	(111) ☐
(112-114) Bilirubin	☐☐.☐ mg/dl	(115) ☐
(116-119) Amylase	☐☐☐☐ Somogyi Units/dl	(120) ☐

Urinalysis		Not Obtained
(121-122) WBC/HPF	☐☐ ("Many" = 99)	(123) ☐
(124-125) RBC/HPF	☐☐ ("Many" = 99)	(126) ☐
(127) Protein (0-4+)	☐	(128) ☐
(129-130) BUN	☐☐ mg/dl	(131) ☐
(132-134) Creatinine	☐☐.☐ mg/dl	(135) ☐
(136-138) Calcium	☐☐.☐ mg/dl	(139) ☐
(140-141) Phosphorus	☐.☐ mg/dl	(142) ☐
(143-144) Albumin	☐.☐ g/dl	(145) ☐
(146-149) Creatine phosphokinase (CPK)	☐☐☐☐ IU/L	(150) ☐
(151) CPK-myocardial band Yes ☐1 No ☐2 Unk ☐9		(152) ☐

(153) EKG Normal ☐1 Abnormal ☐2 Not obtained ☐3 Unk. ☐9 If Abnormal, describe _____

(154) Chest X-Ray Normal ☐1 Abnormal ☐2 Not obtained ☐3 Unk. ☐9 If Abnormal, describe _____

ROME CASE REPORT

before sending to CDC.)

Physician's Name _____ Telephone No. _____

Address _____

CULTURES

BLOOD (155) Positive ☐ 1 Negative ☐ 2 Not Done ☐ 3 Unk ☐ 9 **If Positive,** what organism(s): 1 _____ (156-157) 2 _____ (158-159)

URINE (160) Positive ☐ 1 Negative ☐ 2 Not Done ☐ 3 Unk ☐ 9 **If Positive,** what organism(s): 1 _____ (161-162) 2 _____ (163-164)

Colony Count 1. ☐☐☐ 000/ml (165-167) 2. ☐☐☐ 000/ml (168-170

THROAT (171) Normal Flora ☐ 1 Abnormal ☐ 2 Not Done ☐ 3 Unk ☐ 9 **If Abnormal,** what organism(s): 1. _____ (172-173) 2. _____ (174-175)

NARES (176) Done ☐ 1 Not Done ☐ 3 Unk ☐ 9 **If Done,** what organism(s): 1. _____ (177-178) 2. _____ (179-180)

VAGINA (181) Done ☐ 1 Not Done ☐ 3 Unk ☐ 9 **If Done,** what organism(s): 1. _____ (182-183) 2. _____ (184-185)

Was *Staphylococcus aureus* present in the vagina? (186) **Yes** ☐ 1 **No** ☐ 2 **Unk** ☐ 9

If *S. aureus* present in vagina, is it resistant to penicillin and ampicillin only? (187) Yes ☐ 1 No ☐ 2 Unk ☐ 9

Other Site(s) _____ (188-189) **Organism(s)** 1. _____ (190-191) 2. _____ (192-193)

Was patient taking antibiotics when culture(s) performed? (194) Yes ☐1 No ☐2 Unk. ☐9 If yes, which sites? _____ (195-196)

TAMPON/NAPKIN/MINIPAD USE – IF APPLICABLE (During Period When Patient Became Ill)

PRODUCTS USED (197-198)

Tampon only ☐ 1 Minipad only ☐ 3 Tampon and Minipad ☐ 5 Tampon, Napkin, and Minipad ☐ 7 Other _____ (199-200) ☐ 10

Napkin only ☐ 2 Tampon and Napkin ☐ 4 Napkin and Minipad ☐ 6 Sea Sponge ☐ 8 Unknown ☐ 9

(If Only One Brand Was Used Before Onset of Symptoms, List Only That Brand)

BRAND # 1 (Most frequently used, judged by time)

NAME (201-202)

Assure	☐ 1
Kotex	
Plastic Inserter	☐ 2
Stick Inserter	☐ 3
Inserter Unk	☐ 4
o.b.	☐ 5
Playtex	
Deodorized	☐ 6
Non-deodorized	☐ 7
Deodorant unk	☐ 8
Pursettes	☐ 10
Rely	☐ 11
Tampax	☐ 12
Other(specify) _____	☐ 13
Unknown	☐ 9

STYLE(ABSORBENCY) (203)

Super-plus	☐ 1
Super	☐ 2
Regular	☐ 3
Junior	☐ 4
Unknown	☐ 9

BRAND # 2

NAME (204-205)

Assure	☐ 1
Kotex	
Plastic inserter	☐ 2
Stick inserter	☐ 3
Inserter unk	☐ 4
o.b.	☐ 5
Playtex	
Deodorized	☐ 6
Non-deodorized	☐ 7
Deodorant unk	☐ 8
Pursettes	☐ 10
Rely	☐ 11
Tampax	☐ 12
Other (specify) _____	☐ 13
Unknown	☐ 9

STYLE(ABSORBENCY) (206)

Super-plus	☐ 1
Super	☐ 2
Regular	☐ 3
Junior	☐ 4
Unknown	☐ 9

Was Brand No. 1 the only tampon brand used during period when patient became ill? (207)

Yes ☐1 No ☐2 Unk. ☐9

NAPKIN BRAND:

_____ (208-209)

MINIPAD BRAND:

_____ (210-211)

How was information in this section verified? (212)

Patient's Memory	☐ 1
Patient viewing product box	☐ 2
Interviewer viewing product box	☐ 3
Other (describe) _____	☐ 4

RECURRENCE INFORMATION FOR MENSTRUATION - ASSOCIATED CASES

Has patient had similar illness in past during menstrual period? (213) **Yes** ☐1 **No** ☐2 **Unk.** ☐9 **If yes,** how many episodes? (214) One ☐1 Two ☐2 Three ☐3 More than Three ☐4

OTHER INFORMATION

Please describe any other pertinent or unusual features of this case _____

How was case reported to Health Department? (215) By patient or relative ☐1 By physician ☐2 By hospital ☐3 Other ☐4

Person Completing Form	Date Reported to Health Department (216-221)	Date Form Completed (222-227)

FOR CDC USE ONLY ☐1 ☐2 ☐3 ☐4 (228)

existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this RA; Hubert H. Humphrey Bldg., Rm. 737-F; 200 Independence Ave., SW; Washington, D.C.; Paperwork Reduction Project (0920-0009); Washington, D.C. 20503.